1 Repair instructions/occurring faults

Defect/error/fault	Described in:
Paint damage on front panel unit	See "Paint damage on front panel unit" on page 2
Leaks in airway system	See "Leaks in the airway system" on page 3
Error message: «Xef28»Pressure meas. inop.«Xaa»	See "Error: «Xef28»Pressure meas. inop.«Xaa»" on page 4
Errors in use of DC module option	See "Errors in use of the DC module option" on page 5
Errors in representation of CO2 data	See "Errors in representation of CO2 data" on page 6
Error message 13.99.130	See "Error message 13.99.130 in conjunction with other error messages" on page 7
Causes of error in O2 calibration	See "Errors in O2 calibration and O2 measurement" on page 8
Noise in ventilation	See "Noise during ventilation" on page 9

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2 Paint damage on front panel unit

On the Evita 4 and Evita 2 dura paint damage arising from manufacturing faults may occur on the front panel unit (control panel or front panel). The adhesion of the paint primer is faulty on some units (around 100), so the paint comes off easily.

Local repair of the faulty paintwork is advisable only as a temporary measure while new units are on order, because the new coating will also come off again.

When ordering components for the Evita 4 the serial number of the control panel must be quoted. The serial number is located on the back of the control panel. The new component is then delivered with the quoted serial number.

The component exchange is handled as a complaint claim.

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3 Leaks in the airway system

If leaks in the airway system are detected in leak testing in the course of the unit check, we recommend the following troubleshooting procedure:

1. Check for mechanical damage:
   Visual inspection of the hoses, tube connectors and the cuvette for damage or visible leakage.
2. Error source: crater of expiratory valve, PEEP valve:
   Seal off outlet of expiratory valve to flow sensor and repeat test. If the measured value is then OK, there is a leak in the crater of the expiratory valve or the actuation pressure of the PEEP is too low. The expiratory valve should be replaced as necessary, and the PEEP valve calibrated. Remove the seal.
3. Error source: expiratory valve:
   Seal socket of expiratory block with a rubber plug and restart leak test. The time until the measured value is obtained is now substantially longer (approx. 10 seconds). If the leak remains, the defect is on the expiration side of the airway system (patient section, pressure measurement block, tube for flush flow). Remove the seal and plug the tube system in with no humidifier.
4. Error source: leaking tube system:
   Disconnect tube from inspiratory socket and seal tube. Start leak test. The time until the measured value is obtained is approx. 20 seconds. If the leak remains, the defect is in the tube system (tubes, cuvette, tube connector). A humidifier must not be integrated in the tube system.
5. Error source: inspiratory block:
   Connect expiratory and inspiratory socket with a short tube and start leak test. If the leak remains, it is in the inspiratory block.
6. Error source: O2 amplifier:
   Unscrew O_2 amplifier on right-hand side of inspiratory block. Take out O_2 sensor, close off opening for O_2 sensor with a rubber plug and restart leak test. If the measured value is now OK, there is a leak due to damage or dirt contamination of the seal between the O_2 amplifier and the inspiratory block.
7. Error source: 100 mbar valve D3.3 and seals:
   Unscrew inspiratory block and check for missing or damaged seals. If no seals appeared faulty, seal off top side of 100 mbar valve D3.3 air-tight using adhesive tape. Refit inspiratory block and start leak test. If the measured value is now OK, there is a leak in the 100 mbar valve.
8. Error source: airway sensors and calibration valves:
   Leaks may occur in the area of the pneumatic valve Y3.1, the airway sensors S6.1 and S6.2, and the calibration valves Y6.1 and Y6.2. When replacing the calibration valves, check that the seals are fitted.

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4 Error: «Xef28»Pressure meas. inop.«Xaa»

If the operation «Xef28»Pressure meas. inop.«Xaa» occurs during operation:

Unit setting: IPPV without AutoFlow; breathing frequency = 0.5 min^{-1}, PEEP = 5 mbar; Pmax = 60 mbar.

Start internal service mode.
Evita 4: «Xef28»Configuration«Xaa» –> «Xef28»Basic settings«Xaa» –> «Xef28»Service diagnosis«Xaa»
Evita 2 dura: «Xef28»Config./Calibrate«Xaa» –> «Xef28»Ventilation«Xaa»
Then enter the access code «Xef28»4655«Xaa». The data for the airway sensors are mapped under the «Xef28»Pneumatic«Xaa» and «Xef28»Sensors«Xaa» menu items.

In relation to the selected ventilation parameters the following error messages may occur, but can be ignored: «Xef28»Fail to cycle«Xaa» and «Xef28»Airway pressure too low«Xaa»

The voltage values for the sensors displayed in internal service mode should be approx. 1.74 V at ambient pressure **[Cal V]**.
The voltage rises by approx. 40 mV per mbar.

The following airway pressure sensor data may indicate defects:

1. If the voltage values **[V]** for **[insp]** and **[exp]** differ widely,
   –> sensors defective, water in expiratory valve.
2. If the voltage values **[Cal V]** for **[insp]** and **[exp]** differ widely,
   –> calibration valves defective.

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5 Errors in use of the DC module option

In installation and operation of the DC module option, a variety of errors can occur. The following section outlines a number of error characteristics:

1. When the unit is switched on the audible power failure alarm sounds, even though mains power is connected. The unit is not operational.
   -> Connector k of DC module is faulty or not plugged in.
2. The DC module exhibits no function when the mains voltage fails. The audible power failure alarm sounds.
   -> Connector h not plugged into DC module or rechargeable batteries defective.
3. When the unit is switched on the warning: «Xef28»Int. battery...«Xaa» appears even though the mains power is connected.
   -> Connector g (FASTON) not swapped over in installation or faulty.
4. No mains power or battery symbols are shown on the display. No alarm is delivered in operation with the internal or external rechargeable battery. The power failure is only signalled, by the audible power failure alarm, when the internal battery has discharged.
   -> DC module option not activated (code '4811')

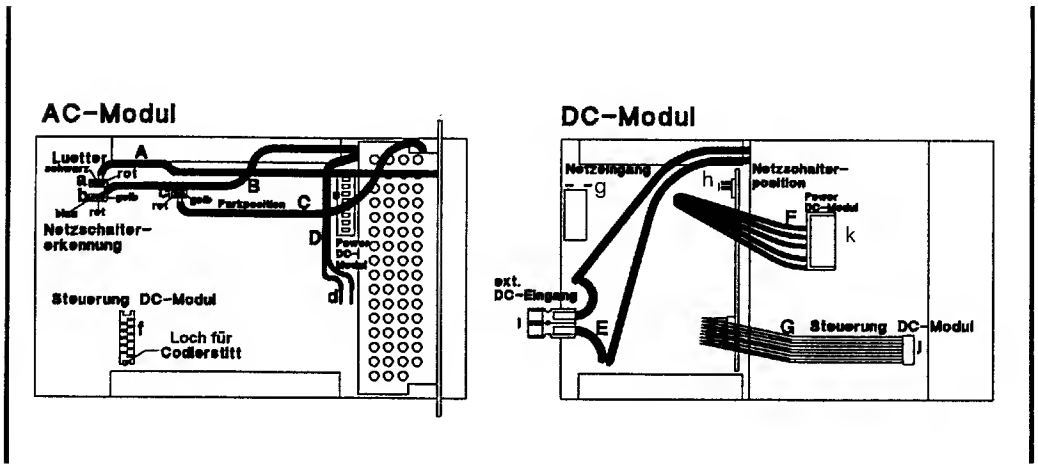

Fig. 1: DC module connector

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6 Errors in representation of CO2 data

The CO2 data are represented as curves and numbers on the display of the Evita 4/2dura.

No display of CO2 data:
Neither the number values nor the curve are shown. The «Xef28»CO2«Xaa» option is not offered under the «Xef28»Alarm limits«Xaa» -> «Xef28»Monitoring«Xaa» menu item–> CO2 monitoring must be activated (service code «Xef28»6795«Xaa») or the CO2 sensor was not detected when the Evita 4/2 dura was switched on.

Breaks in curve; CO2 value always zero; CO2 calibration not possible:
Frequently this means there is a defect in the Power Supply PCB –> Replace the Power Supply PCB.

Even though the sensor is connected the message «Xef28»CO2 sensor?«Xaa» sporadically appears:
The CO2 sensor is not detected when CO2 measurement is active and the curve or value representation temporarily fails –> Cable between Signal Processor PCB and sensor socket on Evita 4/2dura defective.

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7 Error message 13.99.130 in conjunction with other error messages

Error message 13.99.130 indicates triggering of the watchdog on the CPU PCB. The normal program sequence could not be executed without error.

Error message 13.99.130 in MEDIBUS mode at the COM1 port:
When a monitor is connected to the COM1 port on the CPU PCB, there have been isolated reports of the functioning of the Evita 4/2 dura and being affected and occurrence of error message 13.99.130.
--> In these isolated cases one remedy is to operate the monitor on one of the ports of the Communication PCB (option).

Error message 13.99.130 together with other errors:
If error messages other than error message 13.99.130, such as 02.71.016, 02.12.001 or 10.99.112, have occurred simultaneously, there is probably a problem with the +15V voltage supply. This may be caused by sticking mixer cartridges in the pneumatic unit or defects in the power pack. Short-term mains power failure to units without DC modules may also result in this error combination.

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8 Errors in O2 calibration and O2 measurement

Alarm signal: «Xef28»O2 meas. inop.«Xaa»:
The O2 sensor is measuring a value above 106% (upper limit exceeded) or below 15% (lower limit not reached).

- O2 sensor is defective
- O2 sensor is not calibrated
- O2 sensor did not get 100% O2 during calibration, so the unit may (internally) measure more than 100% O2.
  –> reducer R3.1 clogged; diaphragm assembly in Y3.3 tilted; reducer R1.3 clogged.
- Pressure was applied to O2 sensor during calibration. This results in a concentration > 100% referred to ambient pressure. Consequently the O2 display may be below 21%.
  –> Valve Y3.2 does not open.

Incorrect values in O2 measurement:

- Incorrect gas concentration due to defects in the cartridges or the HPSV Controller PCB.
- Incorrect measurement data due to defective O2 sensors, tilted diaphragm assemblies in Y3.3 or defective Pneumatics PCB.

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9 Noise during ventilation

During the inspiration and expiration phases noise may be emitted by the Evita 4/2 dura, especially in neonatal mode. The following causes of noise have been observed:

1. Noise disturbance from the patient section resulting from flapping diaphragm, damage to the crater, dirty lip seals to the patient section or uncalibrated PEEP valve
   –> Replace cover of patient section with a new one with a 6mm rim;
   clean lip seal; calibrate PEEP valve.
2. Noise disturbance from mixer and slight leakage
   –> Check mixer

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